Synopsis of the thesis entitled

ENVIRONMENTAL BIO-MONITORING EVALUATION OF MANAR RESERVOIR WITH SPECIAL REFERENCE TO PLANKTON PRODUCTIVITY

To be submitted to

Swami Ramanand Teerth Marathwada University, Nanded

By

SHIVAM ARJUNRAO BHOSLE
M.Sc. Environmental Science
Netaji Subhashchandra Bose College, Nanded

Under the Guidance of

Dr. SUDHIR V. SHIVANIKAR
Principal & Head,
Department of Environmental Science,
Netaji Subhashchandra Bose College, Nanded

ABSTRACT

The natural resources and aquatic food ecosystem have become significant in the species diversity studies especially for maintenance, management and conservation. Involvement of various microbial species which belongs to plant and animal community, have typical role in nutrient supplementation for the higher organisms. It will be indirectly benefited to fishermen or society for different regard in the form of nutrient, food supplementation. Hence, the purpose of investigating present research work is to understand and carry thorough investigation of the indicator organisms form the freshwater aquatic ecosystem, which belong to typical selected zooplankton and phytoplankton species. This research will also highlight the health of Manar reservoir for the precious water resources along with its systematic analysis. The entire work will be for about couple of years. Definitely it will yield very productive outcome and widely useful for the well being of humans as well as natural, environmental resources conservation purpose.

Keywords: Freshwater, Bio-monitoring, Plankton, Aquatic ecological study

---

INTRODUCTION

Bio-monitoring is the use of certain species of organisms to gain insight into the general health aspects and pollution status of an aquatic ecosystem. In aquatic ecosystem certain organisms, including specific plankton, respond to minute changes in accordance with pollution status of water bodies. Such changes in the plankton profile of a water body can serve as early warning system and provide us an opportunity to ameliorate the situation before it gets too late. Biochemical, genetic, morphological, physiological changes in certain organisms have been noted as being related to particular environmental stressors and can be used as indicator species.

Resources and aquatic food ecosystem have become significant in species diversity, maintenance, management and conservation through this systematic study. Involvement of various microbial species belonging to plant and animal category have typical role in nutrient supplementation for the higher organisms that will indirectly benefit to fishermen or the people of the society in different regard in the form of nutrient supplementation. Hence, I have chosen this topic to thoroughly study the indicator organisms which belongs to zooplanktons and few phytoplanktons. The assessment will be carried out in future course.

Aquatic ecosystems are having widespread environmental problems because of water pollution. Industrial waste, chemicals, sewage are the major concerns of aquatic systems. Heavy metals are referred as conservative pollutants because they are neither broken at all, nor they are decomposed and eventually become permanent addition to an aquatic environment.

Heavy metals accumulate along the food chains due to their high chemical stability. Thus, changes in concentration of these metals in an aquatic environment may alter the physiological and metabolic activities of aquatic organisms; especially plankton hence, it adds impetus to increased awareness of water pollution.

The contamination of heavy metals in water, sediment and fishes has been well recognized and documented. The only exception is plankton which has a great ecological importance in an aquatic environment and yet not been studied in detail. Amongst them phytoplanktons are the basics of food chain of aquatic eco-system and also a source of food for zooplanktons. They can accumulate metals relatively rapidly from water, even at low concentration and may act as bio-indicator. Zooplanktons are also an important component of

food chain which are the major source of food for higher organisms, i.e. fishes, and plays a vital role in energy transfer for higher tropic level. Hence, it may be a useful bio-indicator of pollution.

Discharge of urban wastewater into natural water bodies leads to eutrophication and hence the growth of algal blooms occurs many a times. These leads to deterioration of hydrological components, sediment type, habitat availability and biological materials. Conventional water treatment systems fail to remove nutrients and are also economically expensive. Treatment with algae is an economical option available worldwide. Any treatment approach, either physical or chemical, drastically disturbs the water body impairing the nutrients and availability of light for floral and faunal. It leads to imbalance in the groups of organisms affecting further food chain up till the top. This dilemmatic state poses challenges for water resource managers and aquatic ecologists, drawing kind attention to the effective restoration and conservation practices.

Restoration adapted for recovering the aspects of clean wetland functions are lost due to physical, chemical and hydrological alterations. Traditional restoration methods with respect to ecological goals have improved the physical functioning of wetlands but least improvements in biodiversity aspects.

STUDY AREA

Present investigation has been undertaken for Manar water reservoir, which is situated at Warwant village of Kandhar taluka, Nanded district of Maharashtra state. It's about a distance of 50 kms from Nanded city. Manar dam is an earth fill dam on Manar (Manyad) river. This project is the upper medium irrigation project which is being constructed in the Godavari basin. Manar river originates from Dharmapuri of Beed district, it passes through Ahmadpur town of Latur district is also the plains in middle and south of Nanded district further it flows in East direction to meet the Manjra River. In due course it meets to Godavari River. Villages like Barul, Tembhurni, Ellur, Shirur, Chowki Mahakaya, Dhanora, Karla, Ratholi, Kauta, Jakapur, Shirsikd, Gonar, Masalga, Naarnali, Khadgaon, Shelgaon, Bhopala and Adampur are beneficiaries of this project. Good aquaculture practices for fish, prawn and other cultures can be done from this project. Water from this reservoir is widely used for agricultural, irrigational, domestic and industrial, aquaculture purposes etc. Especially this reservoir is aimed for fishing, aquaculture and several other aquatic resource productivity. Its huge water storage helps people surrounding this basin and is highly benefited economically. It's widely applicable resources for this area in many ways.

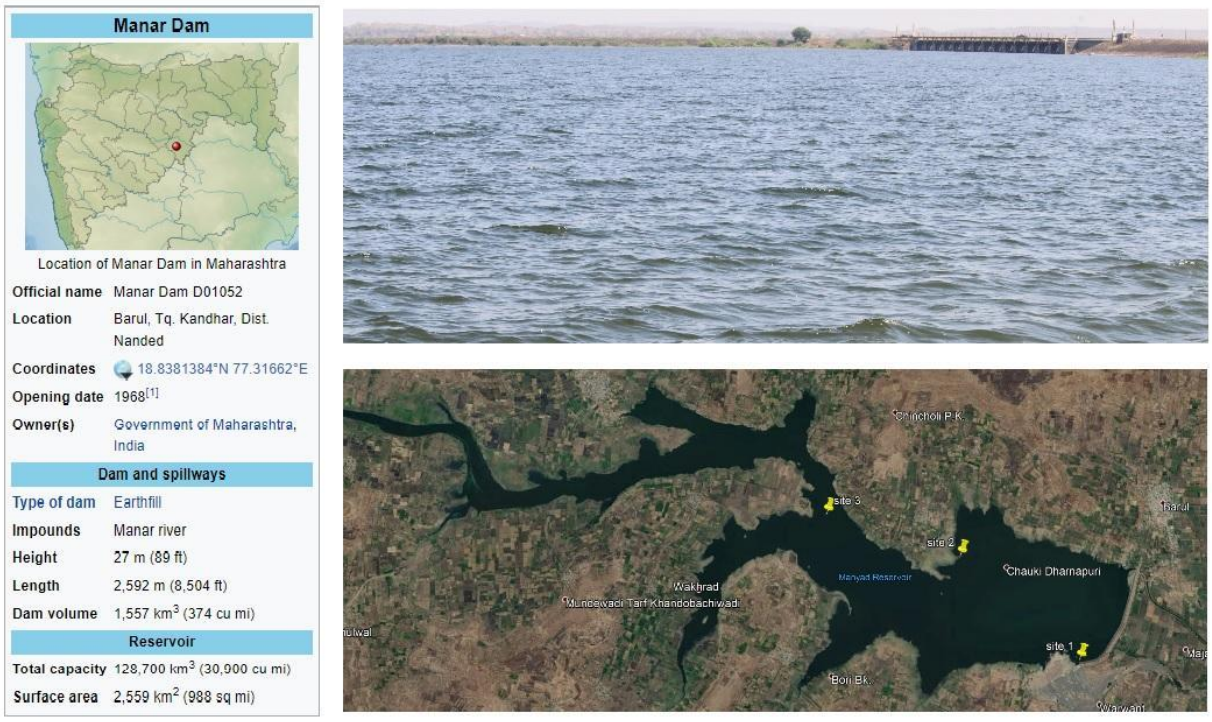

Figure: Manar Reservoir Information, Site Picture, Satellite View.

Sampling Site Locations

Sr. no.	Sampling Site (SS)	Latitude	Longitude
1.	**(SS_1)**	18°49'52.61"N	77°18'56.49"E
2.	**(SS_2)**	18°50'38.34"N	77°18'2.03"E
3.	**(SS_3)**	18°50'57.20"N	77°16'59.15"E
4.	**(SS_4)**	18°50'09.00"N	77°17'39.60"E

OBJECTIVES

1. To study the selected physico-chemical parameters of the Manar dam.
2. Identification and systematic studies of selected zooplankton and phytoplankton.
3. To assess/check the pollution status of this freshwater body in relation to plankton.
4. Understanding the role of bio-indicators for studying health status of this aquatic body and aquatic productivity for human welfare.
5. To educate farmers, people about benefits, significance of bio-monitoring and aquatic ecosystem with reference to plankton.

METHODOLOGY

Water samples will be collected from the selected three sites of Manar reservoir for the period of two years continuously. The water samples will be collected in polyethylene plastic bottles/containers with taking all the precautions as per the standard methods. Various methods and widely useful techniques will be applied for the analysis like APHA. Few water quality parameters will be checked at the sites, further water samples will be brought in the laboratory for systematic analysis. Collection of water sample will be carried out twice in a month.

Following are the parameters undertaken for the recent study. The methodologies to be used to determine parameters are mentioned in brief as;

1. Temperature (Micro-thermometer)
2. pH (Digital pH Meter)
3. Dissolved Oxygen- Winkler's method
4. Biochemical Oxygen Demand
5. Chemical Oxygen Demand
6. Sulphate- (Spectrophotometer)
7. Phosphate (Spectrophotometer)
8. Nitrite – Nitrogen (Spectrophotometer)
9. Zooplankton (Main emphasis)
10. Phytoplankton (Main emphasis).

IMPORTANCE OF STUDY

Contamination of heavy metals in water, sediment and fishes has been well recognized and documented. Only the exceptions are planktons which have a great ecological importance in aquatic environment especially for supplementation of food and yet not been studied in detail. Amongst them phytoplankton is the base of food chain within a system, also a source of food for zooplankton and others. They can accumulate nutrients/minerals/metals relatively rapidly from water even at low concentration and may act as bio-indicators. Zooplankton is also an important component which is the major source of food for higher organisms i.e. fishes and plays a vital role in energy transfer for higher trophic level (aquatic food chain). Hence, it may be a useful bio-indicator of water pollution.

WORK PLAN

Field of study	Environmental Bio-monitoring evaluation of Manar reservoir with special reference to Plankton productivity
Start of PhD studies	After completion of registration procedure
Standard term of study	3 Year
Form of study	Full Time

TIMELINE OF RESEARCH WORK

Time (in month)	Work
00-06	Review of Literature and procedure preparations
06-30	Analysis of water samples and other work with systematic plankton study
30-36	Data collection/statistical interpretation, writing of work and submission process along with research paper publications

REFERENCES

1. https://earth.google.com/web/search/Manar+Dam,+Warwant,+Maharashtra
2. https://www.youtube.com/watch?v=vM_Zbue6a54
3. https://en.wikipedia.org/wiki/Manar_Dam
4. https://www.google.com/

SHIVAM ARJUNRAO BHOSLE
(Research Scholar)

Dr. SUDHIR V. SHIVANIKAR
(Research Guide)

PRINCIPAL
Netaji Subhashchandra Bose
College, NANDED